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FORMULATION AND EVALUATION OF NEW TOPICAL HERBAL CREAM

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ABSTRACT

The goal of the present work was to prepare new Topical natural Herbal cream using *Phyllanthus amarus* and Coriander seeds. The Herbal cream was prepared by mixing cream base and ethanolic extract of *Phyllanthus amarus* and Coriander seeds homogenously. Quality control tests and Invitro studies of the Herbal cream were evaluated. The extract obtained was also subjected to Preliminary phytochemical analysis to identify secondary metabolites. The obtained topical formulation possesses anti-inflammatory activity, anti-oxidant activity which can be used as an herbal remedy for the treatment of pain and inflammation.

Keywords: Herbal cream, Anti-inflammation activity, Antioxidant activity (reducing power assay), Franz diffusion cells (% drug release), Antibacterial activity, Anti-fungal activity

INTRODUCTION

Creams are semisolid dosage forms that are applied topically to the skin, on the surface of the eye, or rectally, vaginally, or through the nose. Herbal creams are emulsions made of water and oil. Herbal creams contain various tinctures, extracts, and essential oils [1]. Natural vitamins and minerals can be found in herbal creams without the use of

potentially harmful synthetic ingredients. There are two types of herbal creams: water-in-oil (W/O) creams and oil-in-water (O/W) creams. Many kinds of plants and plant-based products are employed in the production of various herbal creams with varying application goals. The leafy herbal plant *Phyllanthus amarus* is used

extensively around the world and is well known for its therapeutic qualities. It has diuretic, febrifuge, stomachic, astringent, bitter, and antiseptic properties. The plant is used to treat colds, scabies, ulcers, wounds, jaundice, dropsy, diarrhoea, dysentery, intermittent fevers, and urino-genital system disorders. Its antiviral activity against the hepatitis B virus is good. Additionally, it contains anti-inflammatory and anti-nociceptive properties, as well as antioxidant, antidiabetic, and antilipidemic properties. *Phyllanthus amarus* is a leafy herbal plant, well known for its medicinal properties and widely used worldwide [2]. Dry fruits, Coriander seeds are primarily utilized in culinary preparations. Proteins, lipids, fibres, and a variety of minerals, trace elements, and vitamins were among its many high-nutrient components [3]. Furthermore, the published literature mainly focuses on various aspects of cream formulations only and still require novel formulations using herbs. The creation of herbal creams is still required for safe, nourishing, and healthful benefits without negative or detrimental consequences, even though the literature study focuses on many aspects of cream compositions [4-11]. The current study sought to create and assess a Topical cream with ethanol extract of *Phyllanthus amarus* and coriander seed leaves for its anti-inflammatory properties by using the protein denaturation technique,

anti-oxidant, anti-bacterial and anti-fungal activities.

MATERIALS AND METHODS

All chemicals and solvents used were of analytical grade. Coriander seeds were purchased from a local market, Guntur, Andhra Pradesh, India. *Phyllanthus amarus* were collected from herbal garden of Acharya Nagarjuna University.

Preparation of Extract: Whole plant of *Phyllanthus amarus* and Coriander seeds were shed dried at room temperature and powdered. The prepared raw material was subjected to Maceration using ethanol at room temperature for seven days with intermittent agitation. Liquid extract obtained were separated from the solid residue by vacuum filtration, concentrated using a rotary evaporator and extract was stored in air tight amber colored glass jar.

PRELIMINARY PHYTOCHEMICAL ANALYSIS:

The extract obtained was subjected to the preliminary phytochemical analysis and the results were found in **Table 1**.

NATURAL HERBAL CREAM FORMULATION:

Cream formulation was prepared using ingredients was shown in **Table 2**. The oil phase of cream was prepared by heating the ingredients (Ceto stearyl alcohol, stearic acid, peg 400, lanolin and glycerine) at $75^{\circ}\text{C} \pm 2$ with constant stirring on a water bath. While, for the preparation of aqueous phase,

purified water was heated separately in 200 ml capacity beaker at $80\text{ }^{\circ}\text{C} \pm 2$. To this methyl and propyl parabens were dissolved with occasional stirring and temperature was brought to $75\text{ }^{\circ}\text{C} \pm 2$. The two phases (oil and aqueous) were mixed together with vigorous stirring for about 1-2 minutes. Finally, the extract was added with constant stirring till a thick cream was formed. The temperature was further reduced to around 45°C using cold-water bath. The prepared Herbal cream was stored in wide mouth air tight amber colored bottle.

QUALITY CONTROL TESTS OF HERBAL FORMULATION:

- a) Physical Properties:** The colour, odour and appearance of natural cream were assessed.
- b) Homogeneity:** The uniformity of the formulation was tested by visual appearance and by touch.
- c) pH of the Cream:** The standard buffer solution was used to calibrate the P^{H} meter. After weighing and dissolving around 0.5 gm of herbal cream in 50 ml of distilled water, the pH of the cream was determined.
- d) Viscosity:** The Brookfield Viscometer (model LV-DV-II, Helipath-spindle type S-96) was used to measure the viscosity of herbal cream.
- e) After feel:** By application of herbal cream to the skin, emolliency and greasiness were evaluated.

f) Type of smear: After application of herbal cream, the type of film or smear formed on the skin were checked.

g) Removal: The applied area was washed with tap water to test how easy it was to remove the herbal cream.

h) Irritancy test: On the dorsal surface of the left hand, mark a 1 sq. cm area. Time was recorded after the application of herbal cream to the designated area. Erythema, Edema, and Irritation were observed for up to 24 hours at regular intervals.

The results of Quality Control parameters were found in **Table 3**.

IN-VITRO EVALUATION

ANTI-INFLAMMATION ACTIVITY:

4ml was taken from different concentrations of working standard solutions of test and standard (Diclofenac sodium) in to different test tubes. 0.4ml of egg albumin solution and 5.6ml of phosphate buffer (6.4P^{H}) were added to different concentrations (100-250 $\mu\text{g/ml}$). After 15 minutes of incubation at 37°C in an incubator, the reaction mixture was heated for five minutes at 70°C in a water bath. After reaching room temperature, the Shimadzu UV-1800 UV-Visible Spectrophotometer was used to detect absorbance at 424 nm. **Table 4** shows the percentage of inhibition of denaturation that was computed for both test and standard solutions in relation to the control.

ANTI OXIDANT ACTIVITY (REDUCING POWER ASSAY):

After taking 1ml from various concentrations of the test and standard working standard solutions (100–250 µg/ml), 2.5ml of phosphate buffer and 2.5ml of potassium ferricyanide were added, and the mixture was incubated for 20 minutes at 50°C. After adding 2.5 ml of trichloroacetic acid, the mixture was centrifuged for 10 minutes at 3000 rpm. 2.5 ml supernatant liquid was collected and combined with 0.5 ml of freshly made ferric chloride solution and 2.5 ml of distilled water. For both test and standard solutions, the absorbance was measured at 712 nm. Reduced assay power for the sample was shown by increased absorbance of the reaction mixture. **Table 5** shows the findings of comparing the herbal cream antioxidant activity to that of standard ascorbic acid.

FRANZ DIFFUSION CELLS (% DRUG RELEASE):

In-vitro diffusion study of the cream was carried out on Franz diffusion cell having 57 ml capacity. Whatman filter paper no.41 and egg membrane were soaked in phosphate buffer (pH 6.4) for 30minutes prior to experiment. Diffusion cell was filled with phosphate buffer, Whatman filter paper no.41 and egg membrane was mounted on different franz diffusion cells. The temperature was maintained at $37 \pm 0.5^\circ\text{C}$. A thin layer of the formulation was applied

to the filter paper. 1ml was withdrawn at predetermined time intervals and equivalent amount of fresh dissolution fluid equilibrated at same temperature was replaced. Collected 1ml solution was made up to 5 ml with Phosphate buffer. The amount of drug permeated was determined using a UV- Spectrophotometer at 245 nm and the findings are shown in **Table 6**.

ANTIBACTERIAL ACTIVITY OF HERBAL CREAM:

The sterile media (dextrose agar) was made and allowed to cool to room temperature. After adding the organism (*Staphylococcus aureus*), it was thoroughly mixed. Under aseptic conditions, the medium was poured into petri dishes. After solidification of medium using a sterile borer, cups were made and cream, standard were placed into different cups. The petri plates were then incubated for 24 hours at $37 \pm 2^\circ\text{C}$, and the growth of microorganisms was noted. The results are shown in **Table 7**.

ANTI-FUNGAL ACTIVITY OF HERBAL CREAM:

Agar sterile medium was prepared and cooled to room temperature. Organism (*Aspergillus Niger*.) was added and stirred well. Under aseptic conditions, the medium was poured into petri dishes. After solidification of medium, using a sterile borer, cups were made and cream, standard were placed into different cups and the petri plates were incubated at $37 \pm 2^\circ\text{C}$ for 48 hrs,

and growth of microorganism was observed and results were found in **Table 7**.

STABILITY STUDIES FOR HERBAL CREAM FORMULATION:

The stability studies were carried out at different temperature conditions (4°C, 25°C, and 37°C) for 60 days. All the evaluation parameters i.e. pH, viscosity, consistency, appearance, after feel, type of smear, removal were studied at different time intervals (15, 30 and 60days). The results were found in **Table 8**.

RESULTS AND DISCUSSION

PRELIMINARY PHYTOCHEMICAL ANALYSIS:

The prepared extract was subjected to phytochemical analysis and found to be rich in secondary metabolites such as steroids, terpenoids, cardiac glycosides, phenols, carbohydrates, tannins, flavonoids, proteins and alkaloids (**Table 1**).

NATURAL HERBAL CREAM FORMULATION:

Cream formulation was prepared using ingredients was shown in **Table 2**

QUALITY CONTROL TESTS FOR HERBAL FORMULATION

COMPARED WITH MARKETED FORMULATION:

All the quality control parameters were found to be within the limits when compared with marketed formulation (**Table 3**).

ANTI-INFLAMMATION ACTIVITY:

The prepared herbal cream possesses anti-inflammatory properties as that of standard and marketed formulation (**Table 4**).

ANTI-OXIDANT TEST: The prepared herbal cream contains anti-oxidant properties as that of standard and marketed formulation (**Table 5**).

% DRUG RELEASE:

Franz diffusion cells was used to study and found to be in vitro drug release as the of marketed formulation (**Table 6**).

ANTI-BACTERIAL ACTIVITY & ANTI-FUNGAL ACTIVITY:

The Herbal cream possesses good anti-bacterial and anti-fungal activity (**Table 7**).

STABILITY STUDIES FOR HERBAL CREAM FORMULATION:

The stability results of the herbal cream indicated that the cream was stable because there is no change in its quality control parameters (**Table 8**).

Table 1: Preliminary tests for *Phyllanthus amarus* and Coriander seeds extract

S.no	Phytoconstituents	Observation	Extract
1	Steroids	Green color	Present
2	Terpenoids	Reddish brown ring at bottom	Present
3	Cardiac glycosides	Green color was observed	Present
4	Phenols	Dark green color	Present
5	Carbohydrates	Green color	Present
6	Tannins	Light green color	Present
7	Flavonoids	Intense yellow color	Present
8	Proteins	Yellow color	Present
9	Alkaloids	No color change	Present

Table 2: Composition Of Herbal Cream Formulation

Ingredients	Uses	Components (% w/w)
Cetostearyl alcohol	Emulsifier	7
Stearic acid	Emollient, Coemulsifier	8
PGE-400	Emulsifier	2
Lanolin	Emollient	28
Glycerine	Humectant	64
Methyl paraben	Preservative	0.8
Propyl paraben	Preservative	0.08
Ethanollic plant extract (Phyllanthus amarus and Coriander seeds)	Active ingredient	2
Distilled water	Vehicle	20

Table 3: Quality control tests for natural Herbal cream

Parameters	Prepared formulations	Marketed formulation
Appearance	Green	White
Odour	Pleasant	Pleasant
Homogeneity	Excellent	Excellent
Ph	6.3	6.5
Viscosity	2300cps	2435cps
Stability	Stable	Stable
After feel	Emollient	Emollient
Type of smear	Non-greasy	Non-greasy
Removal	Easy	Easy
Irritant	No	No

Table 4: Anti-inflammation test for herbal cream

Concentration	Control	% standard	% Herbal cream	% marketed cream
0	0.083	-	-	-
100	-	38.5%	30%	24%
150	-	42%	34%	38%
200	-	56%	48%	50%
250	-	67.4%	52.6%	56.6%

Table 5: Anti-oxidant test for Herbal cream

Concentration	Control	% cream	% standard	% marketed cream
0	0.032	-	-	-
100	-	40%	46.8%	40%
150	-	59.3%	62%	59.3%
200	-	62.5%	72%	81.2%
250	-	75%	87.5%	90.6%

Table 6: % Drug release

Time in min	Absorbance (herbal cream)		Marketed cream
	Egg membrane	Whatman filter paper	Whatman filter paper
0	0.010	0.050	0.030
15	0.125	0.145	0.232
30	0.191	0.160	0.262
45	0.195	0.229	0.284
1	0.220	0.237	0.362
2	0.245	0.254	0.488
3	0.299	0.267	0.52
4	0.350	0.321	0.612
5	0.457	0.481	0.632

Table 7: Zone of inhibition for Herbal cream

S. No.	Samples	Zone of inhibition (diameter in mm)	
		Anti-bacterial activity	Anti-fungal activity
1	Herbal Cream	23mm	22mm
2	Marketed cream	22mm	22mm
3	Streptomycin	22mm	22mm

Table 8: Stability study for herbal cream

Parameters	1 st month	2 nd month	3 rd month
Appearance	Green	Green	Green
PH	6.3	6.6	6.5
Viscosity	2345cps	2300cps	2500cps
Irritant	NO	NO	NO
Removal	Easy	Easy	Easy
Type of smear	Non-greasy	Non-greasy	Non-greasy
Homogeneity	Excellent	Excellent	Excellent

CONCLUSION:

The topical Herbal formulation possess significant anti-inflammatory activity, antioxidant activity, anti-bacterial activity, anti-fungal activity, which is safe and no side effects. Hence can be used as an herbal remedy for the treatment of pain and local inflammation.

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REFERENCES

- [1] Al-rimawi(F), Yateem(H), and Afaneh(I), Formulation and evaluation of a moisturizing day cream containing olive leaves extract, International journal of development research, 4 (10),2014.
- [2] https://en.wikipedia.org/wiki/Phyllanthus_amarus
- [3] Intisar (m) (Oudah), Yasmine (h) (Ali), Evaluation of aqueous and ethanolic extraction for coriander seeds, leaves and stems and studying their antibacterial activity, Iraqi national journal of nursing specialties, 23 (2), 2010.
- [4] Kumar (pr), Vijayalakshmi (a), Sakthi priyadarshini (s), Development and evaluation of topical formulation with chloroform extract of pisonia grandis leaves for anti-inflammatory, International journal of chem tech research, 6(5), 2014.
- [5] Hajjaj (g), Bounihi (a), Tajani (m), Cherrah (y), Zellou(a), Anti-inflammatory evaluation of aqueous extract of *matricaria chamomilla* L. (asteraceae) in experimental animal models from Morocco, World journal of pharmaceutical research, 2 (5), 2013.
- [6] Jantan (i), Yassin(m), Chin(c), Chen (1), sim, Antifungal activity of the essential oils of nine zingiberaceae species, Pharmaceutical biology, 2003.
- [7] Prakashkumar (b), Modil, nehal (j), Shah, A review article: in vitro release techniques for topical formulations vol 6, issue 05, 2016. Rucha j. Shah, Ashdin Publishing

Journal of Drug and Alcohol Research, 12, 2023.

- [8] Ribeiro (as), Estanqueiro (m), Oliveira (mb) and Lobo (jms), Main benefits and applicability of plant extracts in skin care products, *Cosmetics*, 2015.
- [9] Sana Fatima, Roohi Zaman, Nafis Haider, Shariq Shamsi, Anzar Alam, Design and development of unani anti-inflammatory cream, *Journal of Ayurveda and Integrative Medicine*, 8 (3), 2017,140-144.
- [10] Shahlla Imam, Najma Shaheen, Farhana Tasleem, Iqbal Azhar, Zafar Alam Mahmood, Evaluation of anti-inflammatory and other biological activities of flavonoid based cream formulation for topical application using in vitro model, *International journal of pharmaceutical sciences and research*, 8(10), 2017.
- [11] Sujith (s) (Nair), Molly Mathew and Sreena (K), Formulation and evaluation of herbal cream containing curcuma longa, *International journal of pharmaceutical and chemical sciences*, 1(4), 2012.